

9. *Unio striatus*, Goldf. Petref. pl. 132. f. 3.

From coral rag, Nattheim.

10. *Unio liasinus*, Zieten, Verst. Wurt. pl. 61. f. 2; Bronn, Lethæa Geogn. pl. 19. f. 17.

From Fildres near Stuttgart. This is evidently a *Gresslya*, allied to *Amphidesma rotundatum*, Phillips.

XV.—On the Marine Algæ of the vicinity of Aberdeen. By G. DICKIE, M.D., Lecturer on Botany in the University and King's College of Aberdeen*.

[Continued from vol. xiii. p. 335.]

[With a Plate.]

PREVIOUS to entering on the remaining species of the olive-coloured Algæ found in this vicinity, it will be necessary to direct attention to the difference usually understood between the reproductive bodies called *spores* and *sporidia*.

The remarks already made on the *acrospirms* (*sporidia*) of *Fucus*, &c., and the accompanying figures, will sufficiently explain their structure; it must be observed, that up to the time of maturity they are enclosed in cells (*asci*), from which, when ripe, they are readily emitted. It is more than probable, however, that there are instances in which there is an intimate adhesion between the *sporidia* and their *asci*, so that both drop off together.

The observations recorded in the first part of this communication, on the development of the seeds of *Fucus serratus*, will explain the nature of *spores*; the latter are not necessarily enclosed in cells up to the time of maturity, but usually become free.

A difference exists in many Algæ between the appearance of the contents of the *spores* and *sporidia*: in the latter, the granular matter has a tendency to cohere in masses, which often assume a definite arrangement; the contents of the *spores* are more abundant, so much so that these bodies are generally dark-coloured and almost opaque,—hence the expression *Melanospermeæ*, and the granular matter probably never (?) assumes a definite arrangement.

SPOROCHNOIDÆ.

Desmarestia ligulata, Lamour.—This species appears to be of rare occurrence, strictly confined to deep water, and only found cast up after storms. The first specimens were found by Dr. Andrew Fleming in October last, on the beach near Don mouth,

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after a gale, and a few days subsequently I found some very large examples near the mouth of the Dee.

D. aculeata, Lamour.—Is very abundant, and, like the former, an inhabitant mostly of deep water; on one occasion only have I seen it *in situ* at low-water mark.

Owing to the localities in which these species grow, no opportunity has been afforded of procuring them at different seasons in states favourable for microscopic examination. The fructification has by some been supposed to be connected with the pencils of filaments which are plentifully produced. The structure of these filaments differs essentially from that of the simple or branched filaments which usually accompany the *spores* and *sporidia* in other Algæ; in *Desmarestia* they are generally flattened, being composed of several slices of cells on the same plane, and often appear like fronds in miniature. It is by no means improbable that they afford one way by which the plants are propagated. The very fact that these filaments (miniature fronds?) are so copiously produced, may be the very reason that neither true *spores* nor *sporidia* have hitherto been found. Among Phænogamous plants there are examples of what may be an analogous mode of reproduction, as in *Saxifraga foliolosa*, Br., of the Arctic regions, and others; in mosses, as *Macromitrium Leprieurii*, Montagne. The same is no doubt true of some Lichens, and why not also of Algæ?

Mr. Lyell has presented me with specimens of *D. aculeata* picked up on the beach of Cockburn Island, lat. 64° 12' S.: in this desolate region the temperature may be unfavourable to the development of true fructification, and the viviparous (?) mode alluded to may be legitimately inferred.

From the structure of the frond in our two species of *Desmarestia*, I should be inclined to predict that the fructification, when detected, will be found to consist of *spores*.

DICTYOTÆ.

Padina Pavonia, Lamour.—This beautiful plant is stated, in Dr. Greville's 'Algæ,' and in Sir W. J. Hooker's 'Flora,' to have been found at Aberdeen. The statement, I believe, was first made by Lightfoot, on the authority of Dr. Cargill; I have often searched for it, but in vain.

Dictyosiphon fœniculaceus, Grev.—It occurs in pools between high- and low-water mark, but nearer the former, in great profusion and of large size. It may be reckoned among the most common species. The fructification is stated, in 'Harvey's Manual,' to be rare; I have found it not unfrequently, but only on distorted specimens, not exceeding three or four inches in length.

Punctaria plantaginea, Grev.—Is not uncommon in summer in pools near high-water mark.

Asperococcus echinatus, Grev.—Not uncommon along with the former.

A. pusillus, Hook.—A plant corresponding to the description usually given, and resembling in structure authentic specimens sent me by Mr. Thompson of Belfast, occurs here, though rarely; it is usually parasitical on *Polysiphonia nigrescens*, but very small.

Chorda lomentaria, Grev.—Not unfrequent in pools near high-water mark.

C. filum, Lamour.—This species, so common on many parts of the British coast, and attaining so great a size as that mentioned in the 'Algæ Britannicæ,' is comparatively a rare plant in this vicinity, occurring only in deep pools at high-water mark, and seldom exceeding two feet in length. I have seen it in the small harbour of Stonehaven attached to stones imbedded in mud, and attaining a greater size than at Aberdeen. Dr. Greville describes the fructification as consisting of "external masses of pear-shaped seeds fixed by their base," and gives a figure of these; he however alludes to a second kind, composed of "sessile ovate capsules scattered among clavate articulated filaments," discovered by Captain Carmichael and figured in 'Flora Londinensis.' The bodies described and figured in the 'Algæ Britannicæ' constitute merely the cortical tissue of the plant; the true fruit, consisting of *asci* and *sporidia*, is imbedded in that tissue, and probably identical with the bodies seen by Carmichael and represented in the 'Flora Londinensis,' which I have no opportunity of consulting. I consider it unnecessary to give any representation of this true fructification, since it exactly resembles that of *Alaria* and *Laminaria* already figured.

ECTOCARPEÆ.

Cladostephus verticillatus, Lyngb., and *C. spongiosus*, Ag., are both not uncommon in pools within high-water mark.

Sphacelaria plumosa, Lyngb.—Is one of the rarest of our olive-coloured Algæ; only a few small plants, not exceeding an inch in height, have been found in pools within high-water mark.

S. cirrhosa, Ag.—At least two of the varieties of this species occur abundantly in pools.

S. olivacea, Ag.—Appears to be rather local; it occurs on perpendicular faces of rocks near low-water mark.

Ectocarpus littoralis, Lyngb.—Is very common on the coast, and found abundantly about the mouths of the Dee and Don; it passes more than a mile up the former river, and often grows luxuriantly in places where at low-tide it is freely exposed to a strong current of fresh water.

E. siliculosus, Lyngb.—Very common in pools near high-water mark.

E. Hincksia.—This species, of which, as stated in his ‘Manual,’ Mr. Harvey had only seen one specimen, is very abundant on the fronds of *Laminaria digitata*, and sometimes on *Rhodomenia palmata*, in the latter end of April and in May. It appears to be a very distinct species.

E. tomentosus, Lyngb.—Very common on different species of *Fucus* near low-water mark.

E. granulosus, Ag.—Parasitical on other Algæ in pools near high-water mark, but rare.

E. sphaerophorus, Carm.—In June 1843 this species was found abundantly, parasitical on one of the most abundant of our *Rhodospiræ*, viz. *Calithamnion spongiosum*. It bears fruit copiously, and never exceeds, in this vicinity, an inch in height, and usually is much less.

Myriotrichia filiformis.—Is not unfrequent in pools at high-water mark, attached to small specimens of *Chorda lomentaria*.

CHORDARIEÆ.

Chordaria flagelliformis, Ag.—Is very abundant and generally distributed. The fructification, according to Turner, consists of “oblong or pyriform seeds lying among the concentrical filaments.” I have not been able hitherto clearly to ascertain the true structure of the fructification in this species, but should, from analogy, infer it to consist of spores.

Helminthocladia virescens.—Is in some seasons very abundant on rocks about half way between high- and low-water marks, and straggling specimens occur in pools at the latter.

Corynephora marina, Ag.—This remarkable plant is plentiful in summer, attached to other Algæ and corallines. In Harvey’s ‘Manual’ a passage is quoted from Carmichael in reference to its fructification, the term “sporidia” being made use of: it ought to be “spores.”

In the first part of this communication it was stated that “the coast here is much exposed to the action of heavy seas, and presents few sheltered coves or even calm pools of any extent, and hence probably we may account for the absence of some of the more delicate species;” it must not, however, be inferred that this is the only reason why certain Algæ are entirely absent from our coast; the influence of temperature must be far greater. At least two other species may yet be expected to be found, viz. *Laminaria bulbosa* and *Dichloria viridis*; the former being of such general occurrence on the British coasts, and the latter having been seen in the Moray Frith.

Scarcely one-half of the Melanospermous Algæ enumerated in

Harvey's 'Manual' as occurring in Britain are found here; the proportions will be best seen from the following tabular view.

	Aberdeen.	Britain.
Fucoideæ	7	16
Lichineæ	1	2
Laminariæ	3	7
Sporochnoideæ	2	7
Dictyotæ	6	18
Ectocarpeæ	12	25
Chordariæ	3	5
Total number of species	34	80

Among the *Fucoideæ* the total absence of *Cystoseira* will be observed, and scarcely one-half of the British species occur; of *Laminariæ* scarcely one-half; of *Sporochnoideæ* only one-third, the two species of *Desmarestia* being generally distributed in Britain. There is also a great deficiency in the *Dictyotæ*, *Cutleria*, *Halysieris*, *Padina*, *Dictyota* and *Striaria* being totally absent. Of *Ectocarpeæ* about one-half of the British species are found, and three out of five *Chordariæ*.

It is proposed at an early opportunity to communicate observations similar to the present on the *Rhodosperrææ* of this coast.

The results obtained from careful dissections of the fructification of our *Melanosperrææ* have led to similar examinations of species from other parts of Britain, of which I possess and have only seen dried specimens. These may now be recorded, allowance being necessary for the disadvantageous circumstances under which the dissections have been made.

Dichloria viridis, Grev.—On this plant Dr. Greville states that he has seen no pencils of filaments. On a dried specimen received through the liberality of Mrs. Griffiths they certainly are present; it also appears to have nearly the same structure as *Desmarestia*, and not such as is represented in the 'Algæ Britannicæ'; drying and pressure have, however, probably produced some change. If pencils of filaments (miniature fronds?) are usually produced by it, the remarks already made in reference to *Desmarestia* will also be applicable here.

Sporochnus pedunculatus, Ag.—Described in Harvey's 'Manual' thus: "Fructification club-shaped moniliform filaments, radiating in scattered warts or concentrical in distinct (mostly clavate, stalked) receptacles, often terminated by a deciduous tuft of filaments." The clavate receptacles consist of a central tissue continuous with the short stem, and a cortical, composed of branched filaments placed perpendicularly to the former, and concrete. The pencils of filaments consist of the free ends of the central fibrous tissue. The cortical part (branched filaments) contains distinct *asci* and *sporidia*; these were very evident in a

fragment of an Irish specimen sent me by Mr. Thompson of Belfast. To observe this structure, it is best to employ pressure in a drop of sea-water; the *asci* and *sporidia* are very minute. See Plate II. figs. 1, 2, 3.

Sporochnus rhizodes, Ag.—Having only examined dried specimens of this species, it is with much diffidence that I venture to describe its fructification as differing essentially from that of the last, and consequently requiring to be removed from the same genus. Those who may have opportunities of examining fresh specimens in different stages can alone be entitled finally to decide this question.

The warts are composed of moniliform simple filaments, at the bases of which pear-shaped *spores* will be seen nestling. The resemblance to the fructification of *Asperococcus echinatus* (and probably also to that of *Chordaria flagelliformis*) is most striking. Figs. 4 & 5 represent the structure described.

Elaionema villosum, Berk.—The fructification of this plant was first pointed out by the Rev. M. J. Berkeley, and a figure given in the 'Gleanings of British Algæ.' The structure seen in dried specimens is represented at Pl. II. fig. 7, and differing somewhat from Mr. Berkeley's representation: in fig. 6 is shown the fructification at an early stage; the *asci*, enclosing several *sporidia*, are at that time distinct. I believe, that in a more advanced stage an adhesion takes place between the *asci* and enclosed *sporidia*, fig. 8.

The results above stated have prompted the following "Suggestions towards an Arrangement of the British *Melanospermeæ*."

1. MELANOSPERMEÆ.

Spores and sporidia on the same or on different plants, and in the same or in different conceptacles.

<p><i>a. Heterospermeæ.</i> Cystoseira. Halidrys. Fucus. Himantalia. <i>b. Sporiferæ.</i> Halysieris. Padina. Dictyota. Punctaria. Striaria. Asperococcus. Dictyosiphon.</p> <hr/> <p>Sporochnus (rhizodes). Chordaria. Myriotrichia. Helminthocladia.</p>	<p>Corynephora. — Cladostephus. Lichina. Sphacelaria. Ectocarpus. ? Desmarestia. Dichloria. <i>c. Sporidiferæ.</i> Alaria. Laminaria. Cutleria.</p> <hr/> <p>Chorda. Sporochnus (pedunculatus). Elaionema.</p>
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From an examination of *Cystoseira* under very unfavourable circumstances, viz. of dried specimens, and the fruit probably immature, I am inclined to believe that spores and sporidia occur in the same conceptacles. There is some reason to believe that the same arrangement prevails in *Halidrys*.

In the *Sporiferae* other subdivisions suggest themselves: in some the spores are erumpent, breaking out beneath the cuticle as in *Padina*; in others, as *Striaria*, the spores are unaccompanied by filaments, and *Asperococcus* may be cited where the spores are so accompanied. Should *Desmarestia* and *Dichloria* be found sporiferous, they will be properly placed beside *Halysersis*.

In *Sporidiferae*, as in *Sporiferae*, there occur membranous and filamentous species.

A question may arise as to the relative importance of spores and sporidia; there cannot be a doubt that both are equally capable of propagating the species.

The above can only be considered an imperfect attempt, a mere outline or suggestion; those who possess a thorough knowledge of foreign as well as British species are alone entitled to speak with confidence on the subject, and to such knowledge the author of this attempt can lay no claim, and must leave his suggestions to be added to and amended by more experienced algologists.

XVI.—*Further Observations on the Ornithology of the neighbourhood of Calcutta.* By EDWARD BLYTH, Curator to the Museum of the Asiatic Society of Bengal. *With Notes by H. E. STRICKLAND, M.A.*

[Concluded from p. 48.]

No. 127. (vol. xii. p. 165, *supra*) I observed great numbers of *Hirundo rustica* a few weeks ago, skimming over the salt-water lake a little above Calcutta.

No. 127 a. *Hirundo daurica* (*erythropylgia*, Sykes) was observed in considerable numbers in the middle of April upon the Calcutta esplanade.

No. 128. This is also the *M. dukhunensis* of Sykes. I observe that the *M. picata* of Franklin, which is the *M. variegata*, Latham, is mentioned as having been received from Calcutta in the 'Rev. Zool. par la Soc. Cuv.' 1839, pp. 40 and 138 (this being the only volume of the useful work in question which I have for reference); but I have never heard of the species being obtained in this neighbourhood, having only received it from Central and Southern India.

No. 130. This remarkable species, which is the type of my genus *Nemoricola*, is the *Bergeronette grise des Indes* of Sonnerat, upon which Latham founds his *Motacilla indica*. I obtained one beautiful specimen during last cold season.